### Second call for Abstracts

# 18<sup>th</sup> WaterNet/WARFSA/GWP-SA Symposium on

**Integrated Water Resources Development** and Management: Innovative Technological Advances for Water Security in Eastern and **Southern Africa** 

Jointly convened with the International Association of Hydrological Sciences (IAHS) and the Namibian Ministry of Agriculture, Water and Forestry

Swakopmund Hotel and Entertainment Centre, Swakopmund, Namibia 25<sup>th</sup> - 27<sup>th</sup> October 2017

## Background

The 18th WaterNet/WARFSA/GWP-SA Symposium will be held in Swakopmund, Namibia from 25<sup>th</sup> – 27<sup>th</sup> of October 2017 under the theme Integrated Water Resources Development and Management: Innovative Technological Advances for Water Security in Eastern and Southern Africa. The Namibian Ministry of Agriculture, Water and Forestry is the lead host of the 18th Symposium.

The Symposia have been held annually in the Eastern and Southern African regions for the past 17 years to promote interaction among policymakers, academics, practitioners from water and related sectors, and cooperating partners. Together, they identify regional issues, gaps and priorities that require further research and support. Great emphasis will be placed on integration of knowledge, particularly involving scholars from the natural and social sciences.

This year, the sub-themes of the symposium have been aligned to those of the SADC Research Agenda under the Regional Strategic Action Plan on Integrated Water Resources Development and Management Phase IV. It is intended that researchers identify themes under which their projects fit within the SADC Research Agenda, and thereby contribute to its main objective which is:

Promoting evidence-based implementation of SADC water programmes and projects through multi- and inter-disciplinary research, and synthesis of existing and new information, which will lead to a realisation of SADC developmental goals.





Global Water artnership





#### **Sub-Themes**

Policymakers, academics, practitioners from water and related sectors, and cooperating partners are invited to register and attend the symposium and make use of this opportunity to listen and debate findings from presentations focused on the different sub-themes. Authors with accepted abstracts should now submit their full papers targeting the sub-themes below.

#### Development and Sustainable Implementation of Resilient Water Infrastructure

Infrastructure that supplies water for multiple uses, and delivers adequate sanitation should be robust and resilient if it is to continue to provide vital services in a changing biophysical and socio-economic environment.

The SADC region endeavours to develop water infrastructure that will play a pivotal role in deepening regional integration and addressing poverty whilst ensuring environmental sustainability. According to the SADC's Regional Infrastructure Development Master Plan, the region has adequate water resources for productive and domestic purposes. However, the major challenge is that only 14% of the available renewable water resources are stored, of which 10% is retained in the Kariba and Cahora lakes respectively, which are both on the Zambezi River. Of the estimated total of 2 300 km<sup>3</sup>/year of renewable water resources available, the current level of abstraction is only 44 km<sup>3</sup>/year or 170m<sup>3</sup> / capita/year; 77% of which is used for irrigation, 18% for domestic purposes and 5% is used by industry. The theme explores experiences in the development and the management of water infrastructure at the regional, national and local levels. Regional and national levels issues at the fore include infrastructure development, financing options for water infrastructure and guidelines for infrastructure sharing, i.e. operating, maintenance, sustainable utilisation of surface and ground water and regulation of reservoir activities whilst considering environmental flow requirements. Local level issues include the current state of water supply and sanitation infrastructure for rural, urban and peri-urban areas as well as innovative technological interventions such as the use of telemetry in water supply.

Papers in this sub-theme should include innovations demonstrated by best practises, experiences in water resources planning and management, infrastructure designs, optimisation of distribution networks for reliable and sustainable supply and river basin management at different institutional and spatial scales in the context of rapid change and development.

#### Water for Health, Livelihoods and Economic Development

Water is a scarce resource in almost all the Eastern and Southern African countries making water supply and sanitation a big challenge. Most countries in the two regions lag behind in the provision of adequate water supply and sanitation services to their people. Statistically, countries such as Botswana, South Africa and Zimbabwe are quoted as having high percentages of their populations having access to clean water supply. However, studies have shown that though households have access to improved water sources, these experience prolonged periods of time without any water supply services being provided. The health of members of society is highly dependent on both the quality and the availability of water, and on how well this precious resource is managed.

Africa in general and Eastern and Southern Africa in particular are grappling with impacts of urbanisation and the mushrooming of peri-urban areas, most of which lack adequate water supply and sanitation. Urbanisation is putting pressure on existing water supply and sanitation systems which were constructed for population numbers which are now exceeded. However, better access to clean water, sanitation services and water management in urban areas creates tremendous opportunity for the poor and is a progressive strategy for economic growth. The population in society gain directly from improved access to basic water and sanitation services through improved health, averted health care costs and productive time saved. Good management of water resources brings more certainty and efficiency in productivity across economic sectors and contributes to the health of the ecosystem.

Freshwater scarcity in Africa is further aggravated by wastewater treatment challenges, which cannot keep pace with rapid population growth and urbanization. Population growth, urbanisation and relative improvement in lifestyles in Africa in general and Southern and Eastern Africa in particular have resulted in a rise in water consumption and an increase in discharge of wastewater. Wastewater facilitates surface and underground water pollution which may lead to a myriad of diseases and illness resulting in deaths of both the young and the elderly and vulnerable people. At least 1.8 million children under 5 years, die every year due to water related diseases linked to wastewater. Africa treats only 1% of wasterwater to secondary level. it is important for Eastern and Southern Africa to reflect on how they can come up with appropriate technologies for treating wastewater in order to minimize negative

impacts on human health and the environment and to consider wastewater as a useful resource which can be recycled and used for domestic and productive purposes.

Papers in this sub-theme should address sustainable water supply and sanitation development, technological advances in water reuse and recycling, water utility management and linkages to public health livelihoods and climate change impacts.

#### Water Governance and the Human Right to Water

The 21<sup>st</sup> century has witnessed the unfolding of multiple water challenges which require a substantial shift in the way natural resources in general and water resources in particular are managed. The global water crisis has been defined as a crisis of governance, that is, the failure of water institutions to manage the resource for the well-being of humans and ecosystems. The provision of water infrastructure by itself does not guarantee the envisaged positive social outcomes. The interaction of the various persons that are involved as individuals and groups through various institutional arrangements is key and should be understood.

Issues that need to be examined include identifying perverse and performance-enhancing incentives, accountable financing and operational arrangements, costs of water supply, accountability and stakeholder participation.

Good water governance is intended to enhance the human right to water and sanitation. This emphasises the fact that all people have the right to safe drinking water, sanitation, shelter and basic services. The human right to water is indispensable for leading a life in human dignity. This is in acknowledgement that clean drinking water and sanitation are essential to the realisation of all human rights. In pursuant to this, states and international organisations are committed to provide financial resources, enable capacity-building and technology transfer to help countries, in particular developing countries, to provide safe, clean, accessible and affordable drinking water and sanitation for all. The human right to water is fundamental to leading a life in human dignity and is a prerequisite for the realization of other human rights

This sub-theme calls for papers which address issues related to appropriate water governance arrangements at different levels, (regional, national and local), stakeholder participation in water management at various scales, legal and policy frameworks for water management and their effectiveness and water service delivery models as well, differentiated pricing/subsidization/incentives and the human right to water.

#### Water, Land, Energy and Agriculture

Water, energy and land are some of the key resources required for sustainable living and improvement of people's livelihoods. As populations grow, peoples' diet and life styles change, more and more demand is put on the resources than before. Water is the basis for all development and without it there can be no life. Energy is the input to most economic activities. All activities are land based and there is competition for available land to live on and grow food. Thus, inter-linkages between the three form a nexus. There is a need to enhance agricultural production, sustainable land use and water resources through improved land tenure, management, development and conservation. Meeting the demand for agricultural products while ensuring sustainability of land and water quantity and quality is a major challenge in most regions.

The proportion of irrigated area as a fraction of the total arable land is low across the SADC region. However, the assessment is based on crude methodologies, which are badly in need of revision. Biophysical resources that need to be assessed include determination of irrigation potential vs arable land, suitability of agricultural performance indicators (water use efficiency), and water use by various land uses (such as forestry, biofuel feedstock).

In view of the overall symposium theme of "Innovative technological advances for water security" the papers under this theme should look into policies, programmes, tools and best practices for water use in irrigation, soil conservation, drought mitigation, access to water, land and other natural resources. How can water, land and energy be managed in an integrated manner in the face of increased water scarcity, dominance of water use for agriculture, and need for energy to pump water? The interaction between land, water and energy is an important nexus that needs to be clearly understood, particularly the use of solar energy, rain-fed vs irrigated production and other best practices to reduce pressure on the strained water resources systems. This means taking into account issues such as soil health and degradation.

#### Surface and Groundwater Resources Management and Urbanisation

Efficient and effective water management should be based on accurate assessment of the available water resources, which is a challenge in the region given the poor spatial and temporal distribution of hydrometric and meteorological stations. The commodification of data, especially meteorological data, has compromised the quality of research that has been and can be done. There is need for effective planning, design, management and utilisation of both surface and groundwater resources through an improvement in our understanding of different components of the hydrological cycle and the spatial and temporal distribution of water now and in the future. However, limited hydrological data availability coupled with complex hydrologic and hydrogeological systems has made prediction, planning and management of surface and groundwater resources under different conditions including extreme events, and with a changing climate, a challenge in the Eastern and Southern African regions. The theme focuses on how best to utilise existing data, and how newer technologies, such as satellite images, can improve assessment of both surface and groundwater including transboundary aquifers.

Urbanisation brings another dimension to surface and groundwater by not just changing the landscape but also the hydrology because of localised and non-localised pollution, drainage and flooding due to the peculiarities of the water supply and sanitation, urban and peri-urban agriculture in addition to the traditional economic activities such as industry. An assessment of this phenomenon and how it links with the wider surface and underground systems is critical. The urban landscape is rapidly changing and will continue to change because of economic and political pressures. This means that old planning models can no longer suffice for the new realities. Research needs to be done in relation to how to plan for new urban spaces.

The papers in this sub-theme therefore should focus on addressing issues on enhancing efficient and effective assessment (including real time monitoring against a backdrop of uncertainties in a changing climate and socio-economic conditions), planning and management of surface and groundwater resources and the impact of urbanisation on water resources using appropriate models. Such models should take into consideration the water cycle's response to climate change. Studies which interrogate how countries in the Southern and Eastern Africa can collect, manage and share data on surface and groundwater resources are also welcome.

#### Water, Ecosystems and the Environment

Ecosystems (e.g. forests, wetlands and grasslands) and the environment are critical components of the global water cycle. All freshwater ultimately depends on the continued healthy functioning of ecosystems and the broader environment, and recognizing the water cycle as a biophysical process is essential to achieving sustainable water management. Biodiversity within inland water ecosystems in Eastern and Southern Africa is both highly diverse and of great regional importance to livelihoods and economies. However, development activities are not always cognisant with the conservation of this diversity and it is poorly represented within the development planning process.

All countries in eastern and southern Africa now increasingly realise that greater investments are needed to protect aquatic ecosystems and the environment from the negative impact of human developments. The challenge remains to strike the right balance between allocating water for direct human use (agriculture, power generation, domestic purposes and industry) and indirect use (sustenance of ecosystem goods and services) in view of global challenges such as urbanisation and climate change. There is also the challenge of understanding the linkages between the various water sources and uses, which implies recognizing the existence of, not just hydrological boundaries, but ecosystems boundaries both at the national and transboundary levels as well.

The papers in this sub-theme should address new and innovative methodologies for determining environmental water requirements, recent advances and best practices in environmental impact assessment, valuation of ecosystems services and goods, determining ecosystems boundaries, inclusion of ecosystem goods and services in water resources development and river basin management, wise use of water linked ecosystems and people's livelihoods as well as studies of water quality in the IWRM framework.

#### **Submission of Full Papers**

All the authors whose abstracts were accepted for presentation at the symposium for oral, poster or special session are being invited to submit full papers which will be put in the symposium proceedings. The full papers will be submitted and handled via the conference's EasyChair platform, <a href="https://easychair.org/conferences/?conf=18wnsymp">https://easyChair.org/conferences/?conf=18wnsymp</a>. Authors use the same accounts used for submitting abstracts to submit full papers. You submit your full paper by updating your abstract.

Format for full papers

- The format for all text should be font size 12, Times New Roman and single-spaced
- The title should be no more than 16 words in title case.
- Author's names should be written in such a way that the initials appear first followed by the last name. The authors names should indicate one corresponding author (with an asterisk, \*) and the email of the corresponding author.
- The affiliations of authors should be shown through letter superscripts (such as a, b, c). Five keywords should be included in alphabetical order.
- The abstract on the full paper should include a clear statement of the theoretical issue to be addressed, the research methodology to be presented, and a concise summary of the findings/conclusion.
- Work must be unpublished at time of presentation.
- Maximum of 3 submissions per author, either as single author or joint co-author

### Elservier Journal of Physics and Chemistry of the Earth (JPCE)

After the symposium authors will have an opportunity to submit their papers for review and publication in a special edition of the Journal of Physics and Chemistry of the Earth. It is a journal published by the Elsevier and the normal peer review process will apply. Guidelines for submitting a paper to this journal are available at:

http://www.elsevier.com/journals/physics-and-chemistry-of-the-earth/1474-7065/guide-forauthors

More details on submission will be announced at the symposium. Submissions will be via online. More details on submission will be announced at the symposiun

#### **Special Sessions**

Each special session will be allocated approximately two hours. However, if more time is required the organisers should state this in the proposal. The proposal should state the materials and equipment that will be required.

#### World Wide Fund (WWF) Special Session

10 years after Brisbane: Lessons from Global Environmental Flows Initiatives



#### Context

**Brisbane declaration:** Freshwater ecosystems are the foundation of our social, cultural, and economic well-being. Therefore all governments, development banks, donors, river basin organizations, water and energy associations, multilateral and bilateral institutions, community-based organizations, research institutions, and the private sector across the globe must commit to actions that restore and maintain environmental flow.

Healthy freshwater ecosystems – rivers, lakes, floodplains, wetlands, and estuaries – provide clean water, food, fibre, energy and many other benefits that support economies and livelihoods around the world. They are essential to human health and well-being, and this is particularly true for the majority of the population in the SADC region, particularly rural communities, who have a very direct dependence on these ecosystems for their survival. The last decade has seen frenzied economic development in the region, in response to a hungry local and global commodities market, in contrast with the opposite reality of the sheer poverty of much of the population, and with impacts on freshwater ecosystems. Environmental flows implementation safeguards and ensures continued provisioning of the international public goods that these societies derive from the environment. Not only that, it helps in guaranteeing equity of access and assured supply downstream, including water for economic activities. From a business perspective, maintaining connectivity through environmental flow implementation enhances security of supply (within the limits of hydrological variability) and reduces some of the risk associated with water as an input for production. Through a participatory decision-making process that is informed by sound science, the implementation of environmental flows seeks to provide the water flows needed to sustain freshwater and estuarine ecosystems in co-existence with local livelihoods, agriculture, industry, and cities, thus maintaining the socially-valued benefits of healthy, resilient freshwater ecosystems. When well managed, rivers should support thriving freshwater ecosystems, more resilient livelihoods and sustainable economic growth.

Ten years after the Brisbane declaration and the call for global action in view of all the abovementioned benefits, it is worthwhile to stop and reflect on the successes and failures in implementing environmental flows in the region, and to compare this with global experiences. The purpose of the session is therefore to discuss case studies from the region and beyond, policy and practice implications and come up with recommendations on best practice.

**Structure of the session:** The session will include a keynote speaker, whose talk will give a global overview of case studies, followed by one or two case studies (the number will be determined by the total time allocated for the session), and finally, a panel discussion to interrogate issues and synthesize lessons.

### SADC – Groundwater Management Institute (SADC-GMI) Special Session



#### Groundwater Resources Development and Utilisation in the SADC Region

The SADC Groundwater Management Institute (SADC-GMI) is implementing the World Bank supported Sustainable Groundwater Management in SADC Member States project until 2019. During the 18th WaterNet Symposium, SADC-GMI will partner with WaterNet to run a parallel session on Groundwater Resources Development and Utilisation as part of its mandate to raise awareness and build the capacity of stakeholders to raise the profile of groundwater as an important vehicle for alleviating poverty through improving human wellbeing, livelihoods, food production, ecosystems, industries and growing cities in SADC.

It is estimated that over 70% of the 250 million people living in the SADC region rely on groundwater as their primary source of water. Forty percent of the region's population use informal or unimproved sources of water, which are often unsafe and prone to the effects of drought. Human wellbeing, livelihoods, food security, ecosystems, natural habitats, industries and growing cities are directly reliant on groundwater. Despite varying dependency on groundwater across SADC Member States, groundwater usually provides a critical buffer between dry and rainy seasons. The role of groundwater as key to economic growth is further exacerbated with the expansion of commercial farming and industries. The agricultural sector is the largest consumer of water using 83% of abstracted water. Twelve percent of this water is abstracted from groundwater. In emergent capital cities, such as Lusaka, Gaborone and Dar es Salaam, groundwater is the dominant source of water to meet the demand from expanding factories and growing urban populations. In response to such dependency, some SADC Member States are actively integrating groundwater into their water resource management policies and laws (e.g., Botswana and South Africa).

Member States are actively integrating groundwater into their water resource management policies and laws (e.g., Botswana and South Africa). Despite the overwhelming importance of groundwater, institutional frameworks to manage water at both national and transboundary levels do not feature groundwater prominently. In spite of unequal attention between surface water and groundwater, the economic role of the latter is significant. Economic valuation studies of groundwater undertaken by the SADC Secretariat have illustrated that the Kuiseb, Swakop and Omaruru aquifers in Namibia, for example, have an estimated 25 year NPV of over US\$1.3 billion (SADC, 2011).

SADC-GMI is therefore calling for papers to be presented in this special session. Papers in this subtheme should include innovations demonstrated by best practices and experiences in the research, exploration, development, management and effective utilisation of groundwater resources as a vehicle for sustainable social-economic development in the face of climate change and drought.

#### **TIGER Bridge – Innovative Earth Observation application for Water resources in Agriculture**



TIGER was initiated more than 15 years ago by the European Space Agency (ESA) in the context of the Committee of Earth Observation Satellites (CEOS). During the World Summit for Sustainable Development in 2002 actions in support to African needs were called upon, and ESA immediately reacted by putting in place a dedicated initiative. TIGER is benefiting from the joint exploitation of existing space, water and training-related programmes of United Nations agencies, space agencies (e.g., ESA, the Canadian Space Agency, CEOS partners), international agencies and key African organisations.

The TIGER Capacity Building Facility (TCBF), operational since 2016, is created to support and strengthen the African Research and Development capacity. Some 80 projects and research activities have benefited from data and training actions carried out within the TIGER initiative. More than 300 African water experts, scientists and stakeholders from universities to regional water authorities were trained in the use of EO in support to water management.

Early 2016 10 research projects were selected to receive assistance from TCBF. The aim of the projects was to initiate and/or strengthen research partnerships between African and European scientists

linking expertise in the field of Earth Observation, Water Resources and Agriculture. Projects address irrigation management, agricultural water demand, rainfall harvesting) and the unprecedented observation capabilities of the Sentinel Satellites.

#### **NEPAD Southern African Network of Water Centres of Excellence**

### EartH2Observe – Open access global hydrological EartH2Observe – Open access global hydrological re-analysis data for locally relevant water resources eartH2Observe



develop a global water resources re-analysis dataset. This integrates earth observations (EO), in-situ

on https://docs.google.com/.../1FAIpQLSeSV6 v0TdIuSB5V.../viewform.... More information www.earth2observe.eu

#### ICLEI — Local Government for Sustainability -Africa Secretariat and CSAG — Climate System Analysis Group, University of Cape Town — Special Session



Constraints to and opportunities for the uptake of small-scale

climate resilient water management technologies in southern African city regions

The climate change challenges in Southern Africa are particularly acute, as the projected impacts are significant, and many communities are particularly vulnerable to these impacts. Of particular relevance to the Southern African region's efforts to address climate change is the use and management of scarce water resources. In this respect, developing home-grown, small-scale, context specific climate resilient water management technologies will form an essential part of the solutions package needed to deal with climate change, while ensuring socioeconomic development. We believe that there is a need to further harness the ideas, skills, talents and energy of local African researchers and entrepreneurs in dealing with climate change, particularly in relation to water provision. To contribute to thinking on this topic, ICLEI-Local Governments for Sustainability, in association with the Climate Systems Analysis Group (University of Cape Town), is undertaking a research project to better understand what constraints and opportunities exist in Southern African cities in relation to the uptake of small-scale climate resilient water technologies. The 'African Water Adaptation through Knowledge Empowerment' (AWAKE) project is engaging with stakeholders in the following Southern African cities: Harare, Gaborone, Blantyre, Windhoek, Maputo and Lusaka. Representatives from three of the listed African cities will share their experiences in relation to climate resilient water technologies during this session. The session will be highly interactive and encourage discussion and knowledge sharing with the audience.

#### Namibia Ministry of Agriculture, Water and Forestry (MAWF) — Special Session

Drawing lesson from River Basin Management across

#### **Southern Africa**

LIST LIBERT

Namibia is an arid country, with variable rainfall ranging from less than 50mm along the coast up-to 650mm in the North-east. On average 8% of the country receives good summer rainfall. Water rainfall yields estimates that about 2% becomes river flow, 1% becomes available for groundwater recharge and about 97% is lost through evapotranspiration. All perennial surface waters are shared with neighbouring countries. Therefore are managed in accordance with international water protocols. Scare water resources limit the country's socio-economic development and increase potential for conflict. Namibia has adopted the Integrated Water Resources Management (IWRM) concept. IWRM aims to improve water management systems in a holistic manner and use water sustainably.

The Ministry of Agriculture, Water and Forestry (MAWF) introduced the Basin Management Approach (BMA) to implement IWRM. Functions and responsibilities of IWRM are vested in Basin Management Committees (BMCs), established as institutions under basic principles of stakeholder participation as provided for in Water Resources Management Act 11 of 2013, which elaborates the roles of BMCs. Currently ten BMCs have been established between 2003 and 2015. Main functions include management of water resources along hydrological/geohydrological boundaries, involvement local communities in planning, operation and management of natural resources. Basin water resource management plans are developed to guide BMCs in effective operation. These plans incorporate water quality and quantity monitoring programmes, education, awareness, capacity-building and familiarization trips.

Outcomes show water resources management and climate change agent's impact on multi-stressed systems. Water management should be addressed collaboratively and not in isolation from other natural resources or socio-economic factors. Benefits of IWRM include stakeholder's participation within shared basins, creating a platform for sharing information, joint planning and management of basin resources. Concerns are identified at integrated basin forums and BMCs influence improvements in water resource management with workable solutions.

It is important to note lessons learned regarding enablement, operation and organisation of BMCs fulfilling IWRM principles, and appropriate participation with decentralisation goals. BMCs in Namibia seek practical recommendation from other working basin in Southern Africa and beyond.

#### Deadlines

Deadline of submission of full pape Deadline for early bird registration

#### **Registration fees**

Early bird registration USD 350.00 Payable by 8 September 2017 (Authors should have their registrations paid by this date if they want their papers to be on the programme)

International Student registration	USD 2
Local student registration	USD 2
Normal registration Payable before 18 October 2017 (Proof of studentship to be provided)	USD 4
Late registration Payable after 18 October 2017	USD 5
Exhibitors	USD 6

Special sessions Payable before 18 October 2017

#### **Payment details**

Account Name: Bank: Branch: Branch Code: Account Number: Swift Code: Type of Account: Bank Address: WaterNet Symposium Standard Bank of Namibia Windhoek Branch 08737300 60002433159 SBNMNANX Current Account Standard Bank Centre, 5th Floor c/o Werner List and Post Street Mall, Windhoek, Namibia.

Kindly request for an invoice from <u>waternetsymposium18@gmail.com</u> and <u>18waternetsymposium@gmail.com</u> or generate an individual invoice from <u>http://www.waternetonline.org/annual-</u> <u>symposium/registration</u>

#### Registration

Online registration can be done on http://www.waternetonline.org/annual-symposium/registration

#### For Further Information

Details on the Symposium will be uploaded and updated at the websites indicated as they become available. http://www.waternetonline.org/annual-symposium/

#### For enquiries and requests for invitation

waternetsymposium18@gmail.com and 18waternetsymposium@gmail.com Copy symposium18@waternetonline.org

#### **Travel and Accommodation**

All delegates attending the symposium should secure accommodation early. Travel arrangements will also need to be done on time. More information on accommodation and travel is contained in the Namibia brief which can be found here.